

L22 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2005 ACS on STN  
 AN 2003:550245 CAPLUS  
 DN 139:93834  
 ED Entered STN: 18 Jul 2003  
 TI Porous polyimide films, wiring board substrates therefrom, their  
 manufacture, and electronic appliances therewith minimizing transmission  
 loss  
 IN Ishikawa, Takao; Yamada, Shinji; Kawashima, Toshiyuki; Tahara, Shinji;  
 Ikeda, Kenichi  
 PA Hitachi Ltd., Japan; Nitto Denko Corp.  
 SO Jpn. Kokai Tokkyo Koho, 9 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM C08J009-28  
 ICS B32B015-08; H01L023-14; H05K001-03; H05K003-00; C08L079-08  
 CC 76-14 (Electric Phenomena)  
 Section cross-reference(s): 38  
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003201363	A2	20030718	JP 2002-2000	20020109 <--
JP 2002-2000		20020109		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 2003201363	ICM	C08J009-28
	ICS	B32B015-08; H01L023-14; H05K001-03; H05K003-00; C08L079-08

AB The polyimide films consist of porous layers containing pores mainly of length  
 $\geq 10 \mu\text{m}$  and satisfying dielec. constant  $\leq 2.0$  and dielec.  
 tangent  $\leq 0.003$ , laminated on both sides with skin layers having  
 more dense structure than the porous layers. The shape of pores is  
 detailed. Wiring board substrates comprising conductor foils and the  
 above films are also claimed. In the manufacturing process for the substrates,  
 aromatic polyamic acid layers are formed on conductor foils, submerged in  
 water, dried, and imidized.

ST porous polyimide copper laminate wiring board substrate; transmission loss  
 porous polyimide copper laminate; gelated imidized polyamic acid porous  
 film

IT Telephones  
 (cellular; porous polyimide films, printed circuit board substrates  
 therefrom, their manufacture, and electronic appliances therewith)

IT Porous materials  
 (films; porous polyimide films, printed circuit board substrates  
 therefrom, their manufacture, and electronic appliances therewith)

IT Printed circuit boards  
 (porous polyimide films, printed circuit board substrates therefrom,  
 their manufacture, and electronic appliances therewith)

IT Films  
 (porous; porous polyimide films, printed circuit board substrates  
 therefrom, their manufacture, and electronic appliances therewith)

IT Polyimides, uses  
 RL: DEV (Device component use); IMF (Industrial manufacture); TEM  
 (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (porous; porous polyimide films, printed circuit board substrates  
 therefrom, their manufacture, and electronic appliances therewith)

IT 74049-11-9P, 3,3',4,4'-Biphenyltetracarboxylic acid dianhydride-4,4'-  
 diaminodiphenyl ether-p-phenylenediamine copolymer  
 RL: CPS (Chemical process); DEV (Device component use); IMF (Industrial  
 manufacture); PEP (Physical, engineering or chemical process); TEM

(Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)

(porous; porous polyimide films, printed circuit board substrates therefrom, their manufacture, and electronic appliances therewith)

IT 7440-50-8, Copper, processes

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(wiring layers; porous polyimide films, printed circuit board substrates therefrom, their manufacture, and electronic appliances therewith)

RN 74049-11-9P

RN 7440-50-8

L22 ANSWER 2 OF 3 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN

AN 2004-084926 [09] WPIX

DNN N2004-067733 DNC C2004-035137

TI Porous polyimide film for printed wiring board used in mobile telephone, has specific dielectric constant and dielectric loss tangent, and is formed on both surfaces of porous layer.

DC A26 A85 L03 P73 V04 W01 W02

PA (HITA) HITACHI LTD; (NITL) NITTO DENKO CORP

CYC 1

PI JP 2003201363 A 20030718 (200409)\* 9 C08J009-28 <--

ADT JP 2003201363 A JP 2002-2000 20020109

PRAI JP 2002-2000 20020109

IC ICM C08J009-28

ICS B32B015-08; H01L023-14; H05K001-03; H05K003-00

ICI C08L079:08

AB JP2003201363 A UPAB: 20040205

NOVELTY - A porous polyimide film having dielectric constant of 2.0 or less and a dielectric loss tangent of 0.003 or less is formed on both the surfaces of the porous layer having hole (11) of length 10 m or more. The polyimide film is formed on copper foil on which a film of polyamic acid solution is applied.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (1) porous polyimide wiring board;
- (2) porous polyimide substrate;
- (3) porous polyimide substrate manufacturing method;
- (4) porous polyimide film manufacturing method;
- (5) electronic component;
- (6) mobile telephone; and
- (7) high frequency transceiver.

USE - For electronic component (claimed), porous polyimide wiring board (claimed) used as high frequency circuit board, radio frequency (RF) circuit board in antenna such as rod antenna of portable communication apparatus e.g. mobile telephone (claimed). The high frequency circuit board is also used in high frequency transceiver (claimed), antenna of vehicle-mounted radar such as wireless radar, millimeter radar for motor vehicle, and satellite communication.

ADVANTAGE - The polyimide film has high porosity and high strength, by maintaining specific value of the dielectric constant value, hence the polyimide circuit board has low dielectric characteristics and low power consumption with improved reliability.

DESCRIPTION OF DRAWING(S) - The figure shows the sectional view of the porous polyimide wiring board.

Skin layer 6

Sponge-like structure 7

Holes 9-11

Dwg. 4/8

FS CPI EPI GMPI

FA AB; GI

MC CPI: A05-J01B; A10-D03; A11-B05C; A12-E07A; L03-H03; L03-H04E1  
EPI: V04-R; W01-C01A1; W01-C01D3C; W02-A08B; W02-B07A

L22 ANSWER 3 OF 3 JAPIO (C) 2005 JPO on STN

AN 2003-201363 JAPIO

TI POROUS POLYIMIDE FILM, WIRING BOARD USING THE SAME, ITS MANUFACTURING METHOD AND ITS USE

IN ISHIKAWA TAKAO; YAMADA SHINJI; KAWASHIMA TOSHIYUKI; TAWARA SHINJI; IKEDA KENICHI

PA HITACHI LTD

NITTO DENKO CORP

PI JP 2003201363 A 20030718 Heisei

AI JP 2002-2000 (JP2002002000 Heisei) 20020109

PRAI JP 2002-2000 20020109

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003

IC ICM C08J009-28

ICS B32B015-08; H01L023-14; H05K001-03; H05K003-00

ICI C08L079:08

AB PROBLEM TO BE SOLVED: To provide a porous polyimide film having a small dielectric constant and a dielectric dissipation factor, to provide a wiring board using the same, its manufacturing method and various uses using the same.

SOLUTION: In the porous polyimide film that comprises a porous layer and a skin layer which is formed on both surfaces of the porous layer and more dense than in the porous layer, the porous layer has holes mostly of 10  $\mu\text{m}$  length or more, the dielectric constant of 2.0 or less and the dielectric dissipation factor of 0.003 or less. The wiring board using the same, its manufacturing method, an electronic component, a mobile phone and a high frequency transmitter-receiver using the same are provided.

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